MEASUREMENT OF IO'S THERMAL OUTPUT WITH GALILEO NIMS

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Galileo-GEM orbits I24 (October, 1999) and I25 (November, 1999) provide opportunities to closely examine the areas near hotspots at much higher resolution (0.3 to 2.0 for nightside observations of Io's hotspots) than was achievable for earlier orbits in the Galileo/GEM missions (150-600km/pixel). This allows one to obtain information on local thermal gradients near the hot spot and to resolve hotspots that are closely spaced. With the prior observations, the NIMS instrument on Galileo has detected numerous hotspots. Most of the hotspots seen by NIMS exhibited single temperature fit color-temperatures in the range of 350 to 1000 K (temperatures that are above the NIMS minimum detectable temperature of about 180K for filled pixels) and exhibited apparent areas of 5 to 50 km2. The large ratio of sample area to hot spot area has made it challenging to discriminate hotspots that are closely spaced and difficult to measure small thermal areas having temperatures near the limit of sensitivity for NIMS. Fits to the data utilizing multiple temperatures suggest there is both high and low temperature components in each pixel. It has been possible to discriminate between hotspots located within a single pixel when their temperatures are significantly different. The temperature fits in th Pele-Pillan region provides the best example. The new high resolution observations from I24 and I25 permit discriminating these hotspots spatially. yielding more reliable temperature estimates.